SEQUENCE LISTING

<110> MILLENNIUM PHARMACEUTICALS, INC.

<120> ANTI-GCC ANTIBODY MOLECULES AND USE OF SAME TO TEST FOR SUSCEPTIBILITY TO GCC-TARGETED THERAPY

<130> MPI12-018P1RNWOM

<140> US 61/639,376
<141> 2012-04-27

<160> 89

<170> PatentIn version 3.5

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<213> Escherichia coli

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<213> Homo sapiens

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<212> PRT
<213> Homo sapiens

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Gly Ser Tyr Glu Ile Ser Val Leu Met Met Gly Asn Ser Ala Phe Ala
35 40 45

Glu Pro Leu Lys Asn Leu Glu Asp Ala Val Asn Glu Gly Leu Glu Ile
50 55 60

Val Arg Gly Arg Leu Gln Asn Ala Gly Leu Asn Val Thr Val Asn Ala
65 70 75 80

Thr Phe Met Tyr Ser Asp Gly Leu Ile His Asn Ser Gly Asp Cys Arg
85 90 95

Ser Ser Thr Cys Glu Gly Leu Asp Leu Leu Arg Lys Ile Ser Asn Ala
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Gln Arg Met Gly Cys Val Leu Ile Gly Pro Ser Cys Thr Tyr Ser Thr
115 120 125

Phe Gln Met Tyr Leu Asp Thr Glu Leu Ser Tyr Pro Met Ile Ser Ala
130 135 140

Gly Ser Phe Gly Leu Ser Cys Asp Tyr Lys Glu Thr Leu Thr Arg Leu
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Met Ser Pro Ala Arg Lys Leu Met Tyr Phe Leu Val Asn Phe Trp Lys
165 170 175

Thr Asn Asp Leu Pro Phe Lys Thr Tyr Ser Trp Ser Thr Ser Tyr Val
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Tyr Lys Asn Gly Thr Glu Thr Glu Asp Cys Phe Trp Tyr Leu Asn Ala

195 200 205

Leu Glu Ala Ser Val Ser Tyr Phe Ser His Glu Leu Gly Phe Lys Val
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Val Leu Arg Gln Asp Lys Glu Phe Gln Asp Ile Leu Met Asp His Asn
225 230 235 240

Arg Lys Ser Asn Val Ile Ile Met Cys Gly Gly Pro Glu Phe Leu Tyr
245 250 255

Lys Leu Lys Gly Asp Arg Ala Val Ala Glu Asp Ile Val Ile Ile Leu
260 265 270

Val Asp Leu Phe Asn Asp Gln Tyr Phe Glu Asp Asn Val Thr Ala Pro
275 280 285

Asp Tyr Met Lys Asn Val Leu Val Leu Thr Leu Ser Pro Gly Asn Ser
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Leu Leu Asn Ser Ser Phe Ser Arg Asn Leu Ser Pro Thr Lys Arg Asp
305 310 315 320

Phe Ala Leu Ala Tyr Leu Asn Gly Ile Leu Leu Phe Gly His Met Leu
325 330 335

Lys Ile Phe Leu Glu Asn Gly Glu Asn Ile Thr Thr Pro Lys Phe Ala
340 345 350

His Ala Phe Arg Asn Leu Thr Phe Glu Gly Tyr Asp Gly Pro Val Thr
355 360 365

Leu Asp Asp Trp Gly Asp Val Asp Ser Thr Met Val Leu Leu Tyr Thr
370 375 380

Ser Val Asp Thr Lys Lys Tyr Lys Val Leu Leu Thr Tyr Asp Thr His
385 390 395 400

Val Asn Lys Thr Tyr Pro Val Asp Met Ser Pro Thr Phe Thr Trp Lys
405 410 415

Asn Ser Lys Leu Pro Asn Asp Ile Thr Gly Arg Gly Pro Gln Ile Leu
420 425 430

Met Ile Ala Val Phe Thr Leu Thr Gly Ala Val Val Leu Leu Leu Leu
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Val Ala Leu Leu Met Leu Arg Lys Tyr Arg Lys Asp Tyr Glu Leu Arg
450 455 460

Gln Lys Lys Trp Ser His Ile Pro Pro Glu Asn Ile Phe Pro Leu Glu

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Thr Asn Glu Thr Asn His Val Ser Leu Lys Ile Asp Asp Asp Lys Arg
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            500                 505                 510

Val Ile Leu Lys Asp Leu Lys His Asn Asp Gly Asn Phe Thr Glu Lys
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Gln Lys Ile Glu Leu Asn Lys Leu Leu Gln Ile Asp Tyr Tyr Asn Leu
    530                 535                 540

Thr Lys Phe Tyr Gly Thr Val Lys Leu Asp Thr Met Ile Phe Gly Val
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Ile Glu Tyr Cys Glu Arg Gly Ser Leu Arg Glu Val Leu Asn Asp Thr
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Ile Ser Tyr Pro Asp Gly Thr Phe Met Asp Trp Glu Phe Lys Ile Ser
            580                 585                 590

Val Leu Tyr Asp Ile Ala Lys Gly Met Ser Tyr Leu His Ser Ser Lys
        595                 600                 605

Thr Glu Val His Gly Arg Leu Lys Ser Thr Asn Cys Val Val Asp Ser
    610                 615                 620

Arg Met Val Val Lys Ile Thr Asp Phe Gly Cys Asn Ser Ile Leu Pro
625                 630                 635                 640

Pro Lys Lys Asp Leu Trp Thr Ala Pro Glu His Leu Arg Gln Ala Asn
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Ile Ser Gln Lys Gly Asp Val Tyr Ser Tyr Gly Ile Ile Ala Gln Glu
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Ile Ile Leu Arg Lys Glu Thr Phe Tyr Thr Leu Ser Cys Arg Asp Arg
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Asn Glu Lys Ile Phe Arg Val Glu Asn Ser Asn Gly Met Lys Pro Phe
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Arg Pro Asp Leu Phe Leu Glu Thr Ala Glu Glu Lys Glu Leu Glu Val
705                 710                 715                 720

Tyr Leu Leu Val Lys Asn Cys Trp Glu Glu Asp Pro Glu Lys Arg Pro
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Asp Phe Lys Lys Ile Glu Thr Thr Leu Ala Lys Ile Phe Gly Leu Phe
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Leu Tyr Lys Ala Glu Arg Asp Arg Ala Asp Arg Leu Asn Phe Met Leu
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Leu Pro Arg Leu Val Val Lys Ser Leu Lys Glu Lys Gly Phe Val Glu
805 810 815

Pro Glu Leu Tyr Glu Glu Val Thr Ile Tyr Phe Ser Asp Ile Val Gly
820 825 830

Phe Thr Thr Ile Cys Lys Tyr Ser Thr Pro Met Glu Val Val Asp Met
835 840 845

Leu Asn Asp Ile Tyr Lys Ser Phe Asp His Ile Val Asp His His Asp
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Val Tyr Lys Val Glu Thr Ile Gly Asp Ala Tyr Met Val Ala Ser Gly
865 870 875 880

Leu Pro Lys Arg Asn Gly Asn Arg His Ala Ile Asp Ile Ala Lys Met
885 890 895

Ala Leu Glu Ile Leu Ser Phe Met Gly Thr Phe Glu Leu Glu His Leu
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Pro Gly Leu Pro Ile Trp Ile Arg Ile Gly Val His Ser Gly Pro Cys
915 920 925

Ala Ala Gly Val Val Gly Ile Lys Met Pro Arg Tyr Cys Leu Phe Gly
930 935 940

Asp Thr Val Asn Thr Ala Ser Arg Met Glu Ser Thr Gly Leu Pro Leu
945 950 955 960

Arg Ile His Val Ser Gly Ser Thr Ile Ala Ile Leu Lys Arg Thr Glu
965 970 975

Cys Gln Phe Leu Tyr Glu Val Arg Gly Glu Thr Tyr Leu Lys Gly Arg
980 985 990

Gly Asn Glu Thr Thr Tyr Trp Leu Thr Gly Met Lys Asp Gln Lys Phe
995 1000 1005

Asn Leu Pro Thr Pro Pro Thr Val Glu Asn Gln Gln Arg Leu Gln

1010 1015 1020

Ala Glu Phe Ser Asp Met Ile Ala Asn Ser Leu Gln Lys Arg Gln
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Ala Ala Gly Ile Arg Ser Gln Lys Pro Arg Arg Val Ala Ser Tyr
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<212> DNA
<213> Artificial Sequence

<220>
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accagtctga cagccgcgga cacggccact tatttctgtg ccagagagga tagtatgggg 360

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aagctctcag tgcccacgag tgagtggcag cggggcgacg tcttcacctg ctccgtgatg 1320

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<211> 711
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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<211> 1377
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic polynucleotide

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<211> 711
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic polynucleotide

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gcgaataaat actttcccga tgtcaccgtc acctgggagg tggatggcac cacccaaaca 540

actggcatcg agaacagtaa aacaccgcag aattctgcag attgtaccta caacctcagc 600

agcactctga cactgaccag cacacagtac aacagccaca aagagtacac ctgcaaggtg 660

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<211> 30
<212> PRT
<213> Homo sapiens

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Ala Pro Asp Tyr Met Lys Asn Val Leu Val Leu Thr Leu Ser
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<210> 9
<211> 25
<212> PRT
<213> Homo sapiens

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<210> 10
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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gggaaggggc tggaatggat cgcaatcatt actcataata gtatcacata ctacgcgagc 180

tgggcgaaaa gccgatccac catcaccaga aacaccagcg agaacacggt gactctgaaa 240

atgaccagtc tgacagccgc ggacacggcc acttatttct gtgccagaga ggatagtatg 300

gggtattatt ttgacttgtg gggcccaggc accctggtca ccatctcctc a 351

<210> 11
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

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Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Ser His Arg
20 25 30

Met Asn Trp Val Arg Gln Thr Pro Gly Lys Gly Leu Glu Trp Ile Ala
35 40 45

Ile Ile Thr His Asn Ser Ile Thr Tyr Tyr Ala Ser Trp Ala Lys Ser
50 55 60

Arg Ser Thr Ile Thr Arg Asn Thr Ser Glu Asn Thr Val Thr Leu Lys
65 70 75 80

Met Thr Ser Leu Thr Ala Ala Asp Thr Ala Thr Tyr Phe Cys Ala Arg
85 90 95

Glu Asp Ser Met Gly Tyr Tyr Phe Asp Leu Trp Gly Pro Gly Thr Leu
100 105 110

Val Thr Ile Ser Ser
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<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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gggcagtctc ccaagcccct gatctacagg gcatccactc tggcatctgg ggtctcatcg 180

cggttcagag gcagtggatc tgggacacag ttcactctca ccatcagtgg cgtggagtgt 240

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ttcggcggag ggaccgaggt ggtggtcaaa 330

<210> 13
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 13
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1 5 10 15

Gly Thr Val Thr Ile Lys Cys Gln Ala Ser Gln Ser Ile Ser Asn Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys Pro Leu Ile
35 40 45

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Tyr Arg Ala Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Arg Gly
    50                  55                  60

Ser Gly Ser Gly Thr Gln Phe Thr Leu Thr Ile Ser Gly Val Glu Cys
65                  70                  75                  80

Ala Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Thr Tyr Thr Asn Asn His
                85                  90                  95

Leu Asp Asn Gly Phe Gly Gly Gly Thr Glu Val Val Val Lys
            100                 105                 110
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<210> 14
<211> 348
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 14
cagtcggtgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagcct ctggatccga catcagtaac tatgcaatat cctgggtccg ccaggctcca 120

gggaaggggc tggaattcat cggatatatt agttatggta aaagtatata ctacgcgagc 180

tgggcgaaag gccggttcgc catctccaaa acctcgtcga ccacggtgga tctggaaatc 240

accagtccga caaccgagga cacggccacc tatttttgtg ccagagagga tagtgctact 300

tatagtccta acttgtgggg cccaggcacc ctggtcaccg tctcctca 348

<210> 15
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 15
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Gln Ser Val Glu Glu Ser Gly Gly Arg Leu Val Thr Pro Gly Thr Pro
1               5                   10                  15

Leu Thr Leu Thr Cys Thr Ala Ser Gly Ser Asp Ile Ser Asn Tyr Ala
            20                  25                  30

Ile Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Phe Ile Gly
        35                  40                  45

Tyr Ile Ser Tyr Gly Lys Ser Ile Tyr Tyr Ala Ser Trp Ala Lys Gly
    50                  55                  60

Arg Phe Ala Ile Ser Lys Thr Ser Ser Thr Thr Val Asp Leu Glu Ile
65                  70                  75                  80
```

Thr Ser Pro Thr Thr Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg Glu
85 90 95

Asp Ser Ala Thr Tyr Ser Pro Asn Leu Trp Gly Pro Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 16
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 16
gcctatgata tgacccagac tccagcctct gtggaggtag ctgtgggagg cacagtcacc 60

atcaagtgcc aggccagtca gagtattaac acctacttag cctggtatca gcagaaacca 120

gggcagcgtc ccaagctcct gatctacagg gcatccactc tggcatctgg ggtctcatcg 180

cggttcaaag gcagtggatc tgggacagag ttcactctca ccatcagcgg cgtggagtgt 240

gccgatgctg ccacttacta ctgtcaacag ggttatagtt ataataatct tgatcgtgct 300

ttcggcggag ggaccgaggt ggtggtcaca 330

<210> 17
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 17
Ala Tyr Asp Met Thr Gln Thr Pro Ala Ser Val Glu Val Ala Val Gly
1 5 10 15

Gly Thr Val Thr Ile Lys Cys Gln Ala Ser Gln Ser Ile Asn Thr Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Arg Pro Lys Leu Leu Ile
35 40 45

Tyr Arg Ala Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Gly Val Glu Cys
65 70 75 80

Ala Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Gly Tyr Ser Tyr Asn Asn

85 90 95

Leu Asp Arg Ala Phe Gly Gly Gly Thr Glu Val Val Val Thr
100 105 110

<210> 18
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 18
agtcatagaa tgaac 15

<210> 19
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 19
atcattactc ataatagtat cacatactac gcgagctggg cgaaaagc 48

<210> 20
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 20
gaggatagta tggggtatta ttttgacttg 30

<210> 21
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 21
Ser His Arg Met Asn
1 5

<210> 22
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 22
Ile Ile Thr His Asn Ser Ile Thr Tyr Tyr Ala Ser Trp Ala Lys Ser
1 5 10 15

<210> 23
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 23
Glu Asp Ser Met Gly Tyr Tyr Phe Asp Leu
1 5 10

<210> 24
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 24
caggccagtc agagcattag taactggtta gcc 33

<210> 25
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 25
agggcatcca ctctggcatc t 21

<210> 26
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 26
cagcagactt atactaataa tcatcttgat aatggt 36

<210> 27
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 27
Gln Ala Ser Gln Ser Ile Ser Asn Trp Leu Ala
1 5 10

<210> 28
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 28
Arg Ala Ser Thr Leu Ala Ser
1 5

<210> 29
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 29
Gln Gln Thr Tyr Thr Asn Asn His Leu Asp Asn Gly
1 5 10

<210> 30
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 30
aactatgcaa tatcc 15

<210> 31
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 31
tatattagtt atggtaaaag tatatactac gcgagctggg cgaaaggc 48

<210> 32
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 32
agtcctaact tg 12

<210> 33
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 33
Asn Tyr Ala Ile Ser
1 5

<210> 34
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 34
Tyr Ile Ser Tyr Gly Lys Ser Ile Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 35
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 35
Glu Asp Ser Ala Thr Tyr Ser Pro Asn Leu
1 5 10

<210> 36
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 36
caggccagtc agagtattaa cacctactta gcc 33

<210> 37
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 37
agggcatcca ctctggcatc t 21

<210> 38
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 38
caacagggtt atagttataa taatcttgat cgtgct 36

<210> 39
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 39
Gln Ala Ser Gln Ser Ile Asn Thr Tyr Leu Ala
1 5 10

<210> 40
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 40
Arg Ala Ser Thr Leu Ala Ser
1 5

<210> 41
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 41
Gln Gln Gly Tyr Ser Tyr Asn Asn Leu Asp Arg Ala
1 5 10

<210> 42
<211> 459
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 42

```
Met Glu Thr Gly Leu Arg Trp Leu Leu Leu Val Ala Val Leu Lys Gly
1               5                  10                  15

Val Gln Cys Gln Ser Val Lys Glu Ser Gly Gly Gly Leu Phe Lys Pro
            20                  25                  30

Thr Asp Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser
        35                  40                  45

Ser His Arg Met Asn Trp Val Arg Gln Thr Pro Gly Lys Gly Leu Glu
    50                  55                  60

Trp Ile Ala Ile Ile Thr His Asn Ser Ile Thr Tyr Tyr Ala Ser Trp
65                  70                  75                  80

Ala Lys Ser Arg Ser Thr Ile Thr Arg Asn Thr Ser Glu Asn Thr Val
                85                  90                  95

Thr Leu Lys Met Thr Ser Leu Thr Ala Ala Asp Thr Ala Thr Tyr Phe
            100                 105                 110

Cys Ala Arg Glu Asp Ser Met Gly Tyr Tyr Phe Asp Leu Trp Gly Pro
        115                 120                 125

Gly Thr Leu Val Thr Ile Ser Ser Gly Gln Pro Lys Ala Pro Ser Val
    130                 135                 140

Phe Pro Leu Ala Pro Cys Cys Gly Asp Thr Pro Ser Ser Thr Val Thr
145                 150                 155                 160

Leu Gly Cys Leu Val Lys Gly Tyr Leu Pro Glu Pro Val Thr Val Thr
                165                 170                 175

Trp Asn Ser Gly Thr Leu Thr Asn Gly Val Arg Thr Phe Pro Ser Val
            180                 185                 190

Arg Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Ser Val Thr
        195                 200                 205

Ser Ser Ser Gln Pro Val Thr Cys Asn Val Ala His Pro Ala Thr Asn
    210                 215                 220

Thr Lys Val Asp Lys Thr Val Ala Pro Ser Thr Cys Ser Lys Pro Thr
225                 230                 235                 240

Cys Pro Pro Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro
                245                 250                 255

Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr
            260                 265                 270
```

```
Cys Val Val Val Asp Val Ser Gln Asp Asp Pro Glu Val Gln Phe Thr
        275                 280                 285


Trp Tyr Ile Asn Asn Glu Gln Val Arg Thr Ala Arg Pro Pro Leu Arg
    290                 295                 300


Glu Gln Gln Phe Asn Ser Thr Ile Arg Val Val Ser Thr Leu Pro Ile
305                 310                 315                 320


Ala His Gln Asp Trp Leu Arg Gly Lys Glu Phe Lys Cys Lys Val His
                325                 330                 335


Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Arg
            340                 345                 350


Gly Gln Pro Leu Glu Pro Lys Val Tyr Thr Met Gly Pro Pro Arg Glu
        355                 360                 365


Glu Leu Ser Ser Arg Ser Val Ser Leu Thr Cys Met Ile Asn Gly Phe
    370                 375                 380


Tyr Pro Ser Asp Ile Ser Val Glu Trp Glu Lys Asn Gly Lys Ala Glu
385                 390                 395                 400


Asp Asn Tyr Lys Thr Thr Pro Ala Val Leu Asp Ser Asp Gly Ser Tyr
                405                 410                 415


Phe Leu Tyr Ser Lys Leu Ser Val Pro Thr Ser Glu Trp Gln Arg Gly
            420                 425                 430


Asp Val Phe Thr Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
        435                 440                 445


Thr Gln Lys Ser Ile Ser Arg Ser Pro Gly Lys
    450                 455


<210> 43
<211> 236
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      polypeptide

<400> 43
Met Asp Thr Arg Ala Pro Thr Gln Leu Leu Gly Leu Leu Leu Leu Trp
1               5                   10                  15


Leu Pro Gly Ala Arg Cys Ala Tyr Asp Met Thr Gln Thr Pro Ala Ser
            20                  25                  30


Val Glu Val Ala Val Gly Gly Thr Val Thr Ile Lys Cys Gln Ala Ser
```

```
        35                  40                  45

Gln Ser Ile Ser Asn Trp Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
    50                  55                  60

Ser Pro Lys Pro Leu Ile Tyr Arg Ala Ser Thr Leu Ala Ser Gly Val
65                  70                  75                  80

Ser Ser Arg Phe Arg Gly Ser Gly Ser Gly Thr Gln Phe Thr Leu Thr
                85                  90                  95

Ile Ser Gly Val Glu Cys Ala Asp Ala Ala Thr Tyr Tyr Cys Gln Gln
            100                 105                 110

Thr Tyr Thr Asn Asn His Leu Asp Asn Gly Phe Gly Gly Gly Thr Glu
        115                 120                 125

Val Val Val Lys Gly Asp Pro Val Ala Pro Thr Val Leu Ile Phe Pro
    130                 135                 140

Pro Ala Ala Asp Gln Val Ala Thr Gly Thr Val Thr Ile Val Cys Val
145                 150                 155                 160

Ala Asn Lys Tyr Phe Pro Asp Val Thr Val Thr Trp Glu Val Asp Gly
                165                 170                 175

Thr Thr Gln Thr Thr Gly Ile Glu Asn Ser Lys Thr Pro Gln Asn Ser
            180                 185                 190

Ala Asp Cys Thr Tyr Asn Leu Ser Ser Thr Leu Thr Leu Thr Ser Thr
        195                 200                 205

Gln Tyr Asn Ser His Lys Glu Tyr Thr Cys Arg Val Thr Gln Gly Thr
    210                 215                 220

Thr Ser Val Val Gln Ser Phe Asn Arg Gly Asp Cys
225                 230                 235


<210> 44
<211> 458
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      polypeptide

<400> 44
Met Glu Thr Gly Leu Arg Trp Leu Leu Leu Val Ala Val Leu Lys Gly
1               5                   10                  15

Val Gln Cys Gln Ser Val Glu Glu Ser Gly Gly Arg Leu Val Thr Pro
            20                  25                  30
```

```
Gly Thr Pro Leu Thr Leu Thr Cys Thr Ala Ser Gly Ser Asp Ile Ser
        35                  40                  45

Asn Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu
    50                  55                  60

Phe Ile Gly Tyr Ile Ser Tyr Gly Lys Ser Ile Tyr Tyr Ala Ser Trp
65                  70                  75                  80

Ala Lys Gly Arg Phe Ala Ile Ser Lys Thr Ser Ser Thr Thr Val Asp
                85                  90                  95

Leu Glu Ile Thr Ser Pro Thr Thr Glu Asp Thr Ala Thr Tyr Phe Cys
            100                 105                 110

Ala Arg Glu Asp Ser Ala Thr Tyr Ser Pro Asn Leu Trp Gly Pro Gly
        115                 120                 125

Thr Leu Val Thr Val Ser Ser Gly Gln Pro Lys Ala Pro Ser Val Phe
    130                 135                 140

Pro Leu Ala Pro Cys Cys Gly Asp Thr Pro Ser Ser Thr Val Thr Leu
145                 150                 155                 160

Gly Cys Leu Val Lys Gly Tyr Leu Pro Glu Pro Val Thr Val Thr Trp
                165                 170                 175

Asn Ser Gly Thr Leu Thr Asn Gly Val Arg Thr Phe Pro Ser Val Arg
            180                 185                 190

Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Ser Val Thr Ser
        195                 200                 205

Ser Ser Gln Pro Val Thr Cys Asn Val Ala His Pro Ala Thr Asn Thr
    210                 215                 220

Lys Val Asp Lys Thr Val Ala Pro Ser Thr Cys Ser Lys Pro Thr Cys
225                 230                 235                 240

Pro Pro Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
                245                 250                 255

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
            260                 265                 270

Val Val Val Asp Val Ser Gln Asp Asp Pro Glu Val Gln Phe Thr Trp
        275                 280                 285

Tyr Ile Asn Asn Glu Gln Val Arg Thr Ala Arg Pro Pro Leu Arg Glu
    290                 295                 300
```

```
Gln Gln Phe Asn Ser Thr Ile Arg Val Val Ser Thr Leu Pro Ile Ala
305                 310                 315                 320

His Gln Asp Trp Leu Arg Gly Lys Glu Phe Lys Cys Lys Val His Asn
                325                 330                 335

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Arg Gly
            340                 345                 350

Gln Pro Leu Glu Pro Lys Val Tyr Thr Met Gly Pro Pro Arg Glu Glu
        355                 360                 365

Leu Ser Ser Arg Ser Val Ser Leu Thr Cys Met Ile Asn Gly Phe Tyr
    370                 375                 380

Pro Ser Asp Ile Ser Val Glu Trp Glu Lys Asn Gly Lys Ala Glu Asp
385                 390                 395                 400

Asn Tyr Lys Thr Thr Pro Ala Val Leu Asp Ser Asp Gly Ser Tyr Phe
                405                 410                 415

Leu Tyr Ser Lys Leu Ser Val Pro Thr Ser Glu Trp Gln Arg Gly Asp
            420                 425                 430

Val Phe Thr Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
        435                 440                 445

Gln Lys Ser Ile Ser Arg Ser Pro Gly Lys
    450                 455


<210> 45
<211> 236
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      polypeptide

<400> 45
Met Asp Thr Arg Ala Pro Thr Gln Leu Leu Gly Leu Leu Leu Leu Trp
1               5                   10                  15

Leu Pro Gly Ala Arg Cys Ala Tyr Asp Met Thr Gln Thr Pro Ala Ser
            20                  25                  30

Val Glu Val Ala Val Gly Gly Thr Val Thr Ile Lys Cys Gln Ala Ser
        35                  40                  45

Gln Ser Ile Asn Thr Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
    50                  55                  60

Arg Pro Lys Leu Leu Ile Tyr Arg Ala Ser Thr Leu Ala Ser Gly Val
```

65 70 75 80

Ser Ser Arg Phe Lys Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr
85 90 95

Ile Ser Gly Val Glu Cys Ala Asp Ala Ala Thr Tyr Tyr Cys Gln Gln
100 105 110

Gly Tyr Ser Tyr Asn Asn Leu Asp Arg Ala Phe Gly Gly Gly Thr Glu
115 120 125

Val Val Val Thr Gly Asp Pro Val Ala Pro Thr Val Leu Ile Phe Pro
130 135 140

Pro Ala Ala Asp Gln Val Ala Thr Gly Thr Val Thr Ile Val Cys Val
145 150 155 160

Ala Asn Lys Tyr Phe Pro Asp Val Thr Val Thr Trp Glu Val Asp Gly
165 170 175

Thr Thr Gln Thr Thr Gly Ile Glu Asn Ser Lys Thr Pro Gln Asn Ser
180 185 190

Ala Asp Cys Thr Tyr Asn Leu Ser Ser Thr Leu Thr Leu Thr Ser Thr
195 200 205

Gln Tyr Asn Ser His Lys Glu Tyr Thr Cys Lys Val Thr Gln Gly Thr
210 215 220

Thr Ser Val Val Gln Ser Phe Asn Arg Gly Asp Cys
225 230 235

<210> 46
<211> 420
<212> PRT
<213> Homo sapiens

<400> 46
Met Lys Thr Leu Leu Leu Asp Leu Ala Leu Trp Ser Leu Leu Phe Gln
1 5 10 15

Pro Gly Trp Leu Ser Phe Ser Ser Gln Val Ser Gln Asn Cys His Asn
20 25 30

Gly Ser Tyr Glu Ile Ser Val Leu Met Met Gly Asn Ser Ala Phe Ala
35 40 45

Glu Pro Leu Lys Asn Leu Glu Asp Ala Val Asn Glu Gly Leu Glu Ile
50 55 60

Val Arg Gly Arg Leu Gln Asn Ala Gly Leu Asn Val Thr Val Asn Ala
65 70 75 80

```
Thr Phe Met Tyr Ser Asp Gly Leu Ile His Asn Ser Gly Asp Cys Arg
                85                  90                  95

Ser Ser Thr Cys Glu Gly Leu Asp Leu Leu Arg Lys Ile Ser Asn Ala
            100                 105                 110

Gln Arg Met Gly Cys Val Leu Ile Gly Pro Ser Cys Thr Tyr Ser Thr
        115                 120                 125

Phe Gln Met Tyr Leu Asp Thr Glu Leu Ser Tyr Pro Met Ile Ser Ala
    130                 135                 140

Gly Ser Phe Gly Leu Ser Cys Asp Tyr Lys Glu Thr Leu Thr Arg Leu
145                 150                 155                 160

Met Ser Pro Ala Arg Lys Leu Met Tyr Phe Leu Val Asn Phe Trp Lys
                165                 170                 175

Thr Asn Asp Leu Pro Phe Lys Thr Tyr Ser Trp Ser Thr Ser Tyr Val
            180                 185                 190

Tyr Lys Asn Gly Thr Glu Thr Glu Asp Cys Phe Trp Tyr Leu Asn Ala
        195                 200                 205

Leu Glu Ala Ser Val Ser Tyr Phe Ser His Glu Leu Gly Phe Lys Val
    210                 215                 220

Val Leu Arg Gln Asp Lys Glu Phe Gln Asp Ile Leu Met Asp His Asn
225                 230                 235                 240

Arg Lys Ser Asn Val Ile Ile Met Cys Gly Gly Pro Glu Phe Leu Tyr
                245                 250                 255

Lys Leu Lys Gly Asp Arg Ala Val Ala Glu Asp Ile Val Ile Ile Leu
            260                 265                 270

Val Asp Leu Phe Asn Asp Gln Tyr Phe Glu Asp Asn Val Thr Ala Pro
        275                 280                 285

Asp Tyr Met Lys Asn Val Leu Val Leu Thr Leu Ser Pro Gly Asn Ser
    290                 295                 300

Leu Leu Asn Ser Ser Phe Ser Arg Asn Leu Ser Pro Thr Lys Arg Asp
305                 310                 315                 320

Phe Ala Leu Ala Tyr Leu Asn Gly Ile Leu Leu Phe Gly His Met Leu
                325                 330                 335

Lys Ile Phe Leu Glu Asn Gly Glu Asn Ile Thr Thr Pro Lys Phe Ala
            340                 345                 350
```

His Ala Phe Arg Asn Leu Thr Phe Glu Gly Tyr Asp Gly Pro Val Thr
355 360 365

Leu Asp Asp Trp Gly Asp Val Asp Ser Thr Met Val Leu Leu Tyr Thr
370 375 380

Ser Val Asp Thr Lys Lys Tyr Lys Val Leu Leu Thr Tyr Asp Thr His
385 390 395 400

Val Asn Lys Thr Tyr Pro Val Asp Met Ser Pro Thr Phe Thr Trp Lys
405 410 415

Asn Ser Lys Leu
420

<210> 47
<211> 2028
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 47
cgcggatccc tcaccatgaa gacgttgctg ttggacttgg ctttgtggtc actgctcttc 60

cagcccgggt ggctgtcctt tagttcccag gtgagtcaga actgccacaa tggcagctat 120

gaaatcagcg tcctgatgat gggcaactca gcctttgcag agcccctgaa aaacttggaa 180

gatgcggtga atgaggggct ggaaatagtg agaggacgtc tgcaaaatgc tggcctaaat 240

gtgactgtga acgctacttt catgtattcg gatggtctga ttcataactc aggcgactgc 300

cggagtagca cctgtgaagg cctcgaccta ctcaggaaaa tttcaaatgc acaacggatg 360

ggctgtgtcc tcatagggcc ctcatgtaca tactccacct tccagatgta ccttgacaca 420

gaattgagct accccatgat ctcagctgga agttttggat tgtcatgtga ctataaagaa 480

accttaacca ggctgatgtc tccagctaga aagttgatgt acttcttggt taacttttgg 540

aaaaccaacg atctgccctt caaaacttat tcctggagca cttcgtatgt ttacaagaat 600

ggtacagaaa ctgaggactg tttctggtac cttaatgctc tggaggctag cgtttcctat 660

ttctcccacg aactcggctt taaggtggtg ttaagacaag ataaggagtt tcaggatatc 720

ttaatggacc acaacaggaa aagcaatgtg attattatgt gtggtggtcc agagttcctc 780

tacaagctga agggtgaccg agcagtggct gaagacattg tcattattct agtggatctt 840

ttcaatgacc agtacttgga ggacaatgtc acagcccctg actatatgaa aaatgtcctt 900

gttctgacgc tgtctcctgg gaattccctt ctaaatagct ctttctccag gaatctatca 960

ccaacaaaac gagactttgc tcttgcctat ttgaatggaa tcctgctctt tggacatatg 1020

ctgaagatat ttcttgaaaa tggagaaaat attaccaccc ccaaatttgc tcatgctttc 1080

aggaatctca cttttgaagg gtatgacggt ccagtgacct tggatgactg gggggatgtt 1140

gacagtacca tggtgcttct gtatacctct gtggacacca agaaatacaa ggttcttttg 1200

acctatgata cccacgtaaa taagacctat cctgtggata tgagccccac attcacttgg 1260

aagaactcta aacttcctaa tgatattaca ggccggggcc ctcagcccag agtgcccata 1320

acacagaacc cctgtcctcc actcaaagag tgtcccccat gcgcagctcc agacctcgca 1380

ggtgcaccat ccgtcttcat cttccctcca aagatcaagg atgtactcat gatctccctg 1440

agccccatgg tcacatgtgt ggtggtggat gtgagcgagg atgacccaga cgtccagatc 1500

agctggtttg tgaacaacgt ggaagtacac acagctcaga cacaaaccca tagagaggat 1560

tacaacagta ctctccgggt ggtcagtgcc ctccccatcc agcaccagga ctggatgagt 1620

ggcaaggcat tcaaatgcaa ggtcaacaac agagccctcc catcccccat cgagaaaacc 1680

atctcaaaac ccagagggcc agtaagagct ccacaggtat atgtcttgcc tccaccagca 1740

gaagagatga ctaagaaaga gttcagtctg acctgcatga tcacaggctt cttacctgcc 1800

gaaattgctg tggactggac cagcaatggg cgtacagagc aaaactacaa gaacaccgca 1860

acagtcctgg actctgatgg ttcttacttc atgtacagca agctcagagt acaaaagagc 1920

acttgggaaa gaggaagtct tttcgcctgc tcagtggtcc acgagggtct gcacaatcac 1980

cttacgacta agaccatctc ccggtctctg ggtaaataat ctagagca 2028

<210> 48
<211> 667
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 48
Met Lys Thr Leu Leu Leu Asp Leu Ala Leu Trp Ser Leu Leu Phe Gln
1 5 10 15

Pro Gly Trp Leu Ser Phe Ser Ser Gln Val Ser Gln Asn Cys His Asn
20 25 30

Gly Ser Tyr Glu Ile Ser Val Leu Met Met Gly Asn Ser Ala Phe Ala
35 40 45

Glu Pro Leu Lys Asn Leu Glu Asp Ala Val Asn Glu Gly Leu Glu Ile
50 55 60

Val Arg Gly Arg Leu Gln Asn Ala Gly Leu Asn Val Thr Val Asn Ala
65 70 75 80

Thr Phe Met Tyr Ser Asp Gly Leu Ile His Asn Ser Gly Asp Cys Arg
85 90 95

Ser Ser Thr Cys Glu Gly Leu Asp Leu Leu Arg Lys Ile Ser Asn Ala
100 105 110

```
Gln Arg Met Gly Cys Val Leu Ile Gly Pro Ser Cys Thr Tyr Ser Thr
        115                 120                 125

Phe Gln Met Tyr Leu Asp Thr Glu Leu Ser Tyr Pro Met Ile Ser Ala
    130                 135                 140

Gly Ser Phe Gly Leu Ser Cys Asp Tyr Lys Glu Thr Leu Thr Arg Leu
145                 150                 155                 160

Met Ser Pro Ala Arg Lys Leu Met Tyr Phe Leu Val Asn Phe Trp Lys
                165                 170                 175

Thr Asn Asp Leu Pro Phe Lys Thr Tyr Ser Trp Ser Thr Ser Tyr Val
            180                 185                 190

Tyr Lys Asn Gly Thr Glu Thr Glu Asp Cys Phe Trp Tyr Leu Asn Ala
        195                 200                 205

Leu Glu Ala Ser Val Ser Tyr Phe Ser His Glu Leu Gly Phe Lys Val
    210                 215                 220

Val Leu Arg Gln Asp Lys Glu Phe Gln Asp Ile Leu Met Asp His Asn
225                 230                 235                 240

Arg Lys Ser Asn Val Ile Ile Met Cys Gly Gly Pro Glu Phe Leu Tyr
                245                 250                 255

Lys Leu Lys Gly Asp Arg Ala Val Ala Glu Asp Ile Val Ile Ile Leu
            260                 265                 270

Val Asp Leu Phe Asn Asp Gln Tyr Leu Glu Asp Asn Val Thr Ala Pro
        275                 280                 285

Asp Tyr Met Lys Asn Val Leu Val Leu Thr Leu Ser Pro Gly Asn Ser
    290                 295                 300

Leu Leu Asn Ser Ser Phe Ser Arg Asn Leu Ser Pro Thr Lys Arg Asp
305                 310                 315                 320

Phe Ala Leu Ala Tyr Leu Asn Gly Ile Leu Leu Phe Gly His Met Leu
                325                 330                 335

Lys Ile Phe Leu Glu Asn Gly Glu Asn Ile Thr Thr Pro Lys Phe Ala
            340                 345                 350

His Ala Phe Arg Asn Leu Thr Phe Glu Gly Tyr Asp Gly Pro Val Thr
        355                 360                 365

Leu Asp Asp Trp Gly Asp Val Asp Ser Thr Met Val Leu Leu Tyr Thr
    370                 375                 380
```

```
Ser Val Asp Thr Lys Lys Tyr Lys Val Leu Leu Thr Tyr Asp Thr His
385                 390                 395                 400

Val Asn Lys Thr Tyr Pro Val Asp Met Ser Pro Thr Phe Thr Trp Lys
                405                 410                 415

Asn Ser Lys Leu Pro Asn Asp Ile Thr Gly Arg Gly Pro Gln Pro Arg
            420                 425                 430

Val Pro Ile Thr Gln Asn Pro Cys Pro Pro Leu Lys Glu Cys Pro Pro
        435                 440                 445

Cys Ala Ala Pro Asp Leu Ala Gly Ala Pro Ser Val Phe Ile Phe Pro
    450                 455                 460

Pro Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Met Val Thr
465                 470                 475                 480

Cys Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser
                485                 490                 495

Trp Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His
            500                 505                 510

Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile
        515                 520                 525

Gln His Gln Asp Trp Met Ser Gly Lys Ala Phe Lys Cys Lys Val Asn
    530                 535                 540

Asn Arg Ala Leu Pro Ser Pro Ile Glu Lys Thr Ile Ser Lys Pro Arg
545                 550                 555                 560

Gly Pro Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Ala Glu
                565                 570                 575

Glu Met Thr Lys Lys Glu Phe Ser Leu Thr Cys Met Ile Thr Gly Phe
            580                 585                 590

Leu Pro Ala Glu Ile Ala Val Asp Trp Thr Ser Asn Gly Arg Thr Glu
        595                 600                 605

Gln Asn Tyr Lys Asn Thr Ala Thr Val Leu Asp Ser Asp Gly Ser Tyr
    610                 615                 620

Phe Met Tyr Ser Lys Leu Arg Val Gln Lys Ser Thr Trp Glu Arg Gly
625                 630                 635                 640

Ser Leu Phe Ala Cys Ser Val Val His Glu Gly Leu His Asn His Leu
                645                 650                 655
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Thr Thr Lys Thr Ile Ser Arg Ser Leu Gly Lys
660 665

<210> 49
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 49
cgcggatccc tcaccatgaa gacgttgctg ttggacttgg c 41

<210> 50
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 50
tgggcactct gggctgaggg ccccggcctg taatatcatt ag 42

<210> 51
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 51
caggccgggg ccctcagccc agagtgccca taacacagaa cccctgtcc 49

<210> 52
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 52
tgctctagat tatttaccca gagaccggga gatggtctta 40

<210> 53
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 53

acctgtggag ctcttactgg 20

<210> 54
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 54
catttcaggt gtcgtgagga 20

<210> 55
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 55
atttaggtga cactatag 18

<210> 56
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 56
gttttcccag tcacgac 17

<210> 57
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<400> 57
aacagctatg accatg 16

<210> 58
<211> 8
<212> PRT
<213> Mus sp.

<400> 58
Pro Arg Val Pro Ile Thr Glu Asn
1 5

<210> 59
<211> 4
<212> PRT

<213> Mus sp.

<400> 59
Leu Leu Gly Gly
1

<210> 60
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 60
Leu Ala Gly Ala
1

<210> 61
<211> 4
<212> PRT
<213> Mus sp.

<400> 61
Lys Lys Gly Gly
1

<210> 62
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 62
Lys Ala Gly Ala
1

<210> 63
<211> 5
<212> PRT
<213> Mus sp.

<400> 63
Glu Phe Lys Cys Lys
1 5

<210> 64
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 64
Ala Phe Lys Cys Lys
1 5

<210> 65
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 65
Phe Lys Cys Lys
1

<210> 66
<211> 5
<212> PRT
<213> Homo sapiens

<400> 66
Gly Arg Gly Pro Gln
1 5

<210> 67
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 67
Gly Tyr Tyr Trp Ser
1 5

<210> 68
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 68
Glu Ile Asn His Arg Gly Asn Thr Asn Asp Asn Pro Ser Leu Lys Ser
1 5 10 15

<210> 69
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 69
Glu Arg Gly Tyr Thr Tyr Gly Asn Phe Asp His
1 5 10

<210> 70

<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 70
Arg Ala Ser Gln Ser Val Ser Arg Asn Leu Ala
1 5 10

<210> 71
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 71
Gly Ala Ser Thr Arg Ala Thr
1 5

<210> 72
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 72
Gln Gln Tyr Lys Thr Trp Pro Arg Thr
1 5

<210> 73
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 73
ggttactact ggagc 15

<210> 74
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 74
gaaatcaatc atcgtggaaa caccaacgac aacccgtccc tcaag 45

<210> 75

<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 75
gaacgtggat acacctatgg taactttgac cac 33

<210> 76
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 76
agggccagtc agagtgttag cagaaactta gcc 33

<210> 77
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 77
ggtgcatcca ccagggccac t 21

<210> 78
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 78
cagcagtata aaacctggcc tcggacg 27

<210> 79
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 79
Gln Val Gln Leu Gln Gln Trp Gly Ala Gly Leu Leu Lys Pro Ser Glu
1 5 10 15

Thr Leu Ser Leu Thr Cys Ala Val Phe Gly Gly Ser Phe Ser Gly Tyr
20 25 30

```
Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile
        35                  40                  45

Gly Glu Ile Asn His Arg Gly Asn Thr Asn Asp Asn Pro Ser Leu Lys
    50                  55                  60

Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln Phe Ala Leu
65                  70                  75                  80

Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala
                85                  90                  95

Arg Glu Arg Gly Tyr Thr Tyr Gly Asn Phe Asp His Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser
        115


<210> 80
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      polypeptide

<400> 80
Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Arg Asn
            20                  25                  30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
        35                  40                  45

Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
    50                  55                  60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Gly Ser Leu Gln Ser
65                  70                  75                  80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Lys Thr Trp Pro Arg
                85                  90                  95

Thr Phe Gly Gln Gly Thr Asn Val Glu Ile Lys
            100                 105


<210> 81
<211> 357
<212> DNA
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 81
caggtgcagc tacagcagtg gggcgcagga ctgttgaagc cttcggagac cctgtccctc 60

acctgcgctg tctttggtgg gtccttcagt ggttactact ggagctggat ccgccagccc 120

ccagggaagg ggctggagtg gattggggaa atcaatcatc gtggaaacac caacgacaac 180

ccgtccctca agagtcgagt caccatatca gtagacacgt ccaagaacca gttcgccctg 240

aagctgagtt ctgtgaccgc cgcggacacg gctgtttatt actgtgcgag agaacgtgga 300

tacacctatg gtaactttga ccactggggc cagggaaccc tggtcaccgt ctcctca 357

<210> 82
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 82
gaaatagtga tgacgcagtc tccagccacc ctgtctgtgt ctccagggga aagagccacc 60

ctctcctgca gggccagtca gagtgttagc agaaacttag cctggtatca gcagaaacct 120

ggccaggctc ccaggctcct catctatggt gcatccacca gggccactgg aatcccagcc 180

aggttcagtg gcagtgggtc tgggacagag ttcactctca ccatcggcag cctgcagtct 240

gaagattttg cagtttatta ctgtcagcag tataaaacct ggcctcggac gttcggccaa 300

gggaccaacg tggaaatcaa a 321

<210> 83
<211> 1444
<212> DNA
<213> Homo sapiens

<400> 83
gaattcctca ccatgggatg gagctgtatc atcctcttct tggtagcaac agctacaggt 60

gtccactccc aggtgcagct acagcagtgg ggcgcaggac tgttgaagcc ttcggagacc 120

ctgtccctca cctgcgctgt ctttggtggg tctttcagtg gttactactg gagctggatc 180

cgccagcccc cagggaaggg gctggagtgg attggggaaa tcaatcatcg tggaaacacc 240

aacgacaacc cgtccctcaa gagtcgagtc accatatcag tagacacgtc caagaaccag 300

ttcgccctga agctgagttc tgtgaccgcc gcggacacgg ctgtttatta ctgtgcgaga 360

gaacgtggat acacctatgg taactttgac cactggggcc agggaaccct ggtcaccgtc 420

agctcagcct ccaccaaggg cccatcggtc ttcccctgg caccctcctc caagagcacc 480

tctgggggca cagcggccct gggctgcctg gtcaaggact acttccccga accggtgacg 540

gtgtcgtgga actcaggcgc cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag 600

tcctcaggac tctactccct cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc 660

cagacctaca tctgcaacgt gaatcacaag cccagcaaca ccaaggtgga caagaaagtt 720

gagcccaaat cttgtgacaa aactcacaca tgcccaccgt gcccagcacc tgaactcctg 780

gggggaccgt cagtcttcct cttcccccca aaacccaagg acaccctcat gatctcccgg 840

acccctgagg tcacatgcgt ggtggtggac gtgagccacg aagaccctga ggtcaagttc 900

aactggtacg tggacggcgt ggaggtgcat aatgccaaga caaagccgcg ggaggagcag 960

tacaacagca cgtaccgtgt ggtcagcgtc ctcaccgtcc tgcaccagga ctggctgaat 1020

ggcaaggagt acaagtgcaa ggtctccaac aaagccctcc cagccccat cgagaaaacc 1080

atctccaaag ccaaagggca gccccgagaa ccacaggtgt acaccctgcc cccatcccgg 1140

gatgagctga ccaagaacca ggtcagcctg acctgcctgg tcaaaggctt ctatcccagc 1200

gacatcgccg tggagtggga gagcaatggg cagccggaga acaactacaa gaccacgcct 1260

cccgtgctgg actccgacgg ctccttcttc ctctacagca agctcaccgt ggacaagagc 1320

aggtggcagc aggggaacgt cttctcatgc tccgtgatgc atgaggctct gcacaaccac 1380

tacacgcaga agagcctctc cctgtctccg ggtaaataat agggataaca gggtaatact 1440

agag 1444

<210> 84
<211> 468
<212> PRT
<213> Homo sapiens

<400> 84
Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr Gly
1 5 10 15

Val His Ser Gln Val Gln Leu Gln Gln Trp Gly Ala Gly Leu Leu Lys
20 25 30

Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Phe Gly Gly Ser Phe
35 40 45

Ser Gly Tyr Tyr Trp Ser Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu
50 55 60

Glu Trp Ile Gly Glu Ile Asn His Arg Gly Asn Thr Asn Asp Asn Pro
65 70 75 80

Ser Leu Lys Ser Arg Val Thr Ile Ser Val Asp Thr Ser Lys Asn Gln
85 90 95

Phe Ala Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Arg Glu Arg Gly Tyr Thr Tyr Gly Asn Phe Asp His Trp
115 120 125

```
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
    130                 135                 140

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
145                 150                 155                 160

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
                165                 170                 175

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
            180                 185                 190

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
        195                 200                 205

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
    210                 215                 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser
225                 230                 235                 240

Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                245                 250                 255

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu
            260                 265                 270

Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
        275                 280                 285

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu
    290                 295                 300

Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr
305                 310                 315                 320

Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
                325                 330                 335

Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro
            340                 345                 350

Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
        355                 360                 365

Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val
    370                 375                 380

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
385                 390                 395                 400
```

```
Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
                405                 410                 415

Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
            420                 425                 430

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
        435                 440                 445

Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
    450                 455                 460

Ser Pro Gly Lys
465
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<210> 85
<211> 722
<212> DNA
<213> Homo sapiens

<400> 85
gcggccgcct caccatggga tggagctgta tcatcctctt cttggtagca acagctacag 60

gtgtccactc cgaaatagtg atgacgcagt ctccagccac cctgtctgtg tctccagggg 120

aaagagccac cctctcctgc agggccagtc agagtgttag cagaaactta gcctggtatc 180

agcagaaacc tggccaggct cccaggctcc tcatctatgg tgcatccacc agggccactg 240

gaatcccagc caggttcagt ggcagtgggt ctgggacaga gttcactctc accatcggca 300

gcctgcagtc tgaagatttt gcagtttatt actgtcagca gtataaaacc tggcctcgga 360

cgttcggcca agggaccaac gtggaaatca aacgtacggt ggctgcacca tctgtcttca 420

tcttcccgcc atctgatgag cagttgaaat ctggaactgc ctctgttgtg tgcctgctga 480

ataacttcta tcccagagag gccaaagtac agtggaaggt ggataacgcc ctccaatcgg 540

gtaactccca ggagagtgtc acagagcagg acagcaagga cagcacctac agcctcagca 600

gcaccctgac cctgagcaaa gcagactacg agaaacacaa agtctacgcc tgcgaagtca 660

cccatcaggg cctgagctcg cccgtcacaa agagcttcaa caggggagag tgttagtcta 720

ga 722

<210> 86
<211> 233
<212> PRT
<213> Homo sapiens

<400> 86
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Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr Gly
1               5                   10                  15

Val His Ser Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val
            20                  25                  30

Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val
```

35 40 45

Ser Arg Asn Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg
50 55 60

Leu Leu Ile Tyr Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Ala Arg
65 70 75 80

Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Gly Ser
85 90 95

Leu Gln Ser Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Lys Thr
100 105 110

Trp Pro Arg Thr Phe Gly Gln Gly Thr Asn Val Glu Ile Lys Arg Thr
115 120 125

Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
130 135 140

Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
145 150 155 160

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
165 170 175

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
180 185 190

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
195 200 205

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
210 215 220

Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230

<210> 87
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<220>
<223> N-term H

<220>
<221> misc_feature
<222> (1)..(6)
<223> Disulfide bond between residues

<220>
<221> misc_feature
<222> (2)..(10)
<223> Disulfide bond between residues

<220>
<221> misc_feature
<222> (5)..(13)
<223> Disulfide bond between residues

<220>
<223> C-term OH

<400> 87
Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr
1 5 10

<210> 88
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
His tag

<220>
<221> misc_feature
<222> (1)..(6)
<223> This sequence may encompass 2, 3, 4, 5, or 6 residues

<400> 88
His His His His His His
1 5

<210> 89
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 89
Gly Phe Leu Gly
1